

Simmonds PRODUCTS, INC.
AEROCCESSORIES, INC.



SIMMONDS AEROCESSORIES, INC.

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Experimental Specification No. 72

SECURITY INFORMATION

28, January 1954

SARAH Drop Zone (DZ) Location Equipment

1. Scope - This specification defines the characteristics of the Ultra Electric, Ltd. drop zone (DZ) equipment. The equipment will be of English manufacture and will fully satisfy the requirements for evaluation of the SARAH System.

2. General - The SARAH system is a new homing system specifically designed to facilitate rapid search for and accurate homing on an unknown location. The system utilizes a free-running, pulse modulated beacon and a receiver with a presentation designed to operate in synchronism with the beacon(s) being received. This is accomplished by emitting pairs of pulses at a low repetition frequency, the first of which is used to trigger the time base on an oscillographic presentation at the receiver and the second for writing. By this means the advantage of integration to improve the signal-to-noise ratio (and hence the range) is achieved without the complexity of an interrogator-transponder system. Left and right looking antennas are alternately switched into the receiver and the receiver output synchronously displayed to give homing information. Further advantages of the system are extreme battery economy and independent display, with identity, of several beacons. A voice communication facility may be provided. Transmission is by means of pulse frequency modulation from the beacon and A.M. reception at the beacon by super-regenerative detection.

3. Composition.-

3.1 The DZ beacon equipment consists of a zone marker beacon, speech unit, antenna, and interconnecting cables. ~~Primary power input power is from a 6 volt battery to be supplied by the customer.~~ BATTERIES REQUESTED SUPPLIED BY CONTRACTOR. *Black 1828.24*

3.2 The aircraft receiving equipment consists of Receiver Unit with Speech Facility, Power Unit, Receiver Power Unit Connecting Cable, Input Connecting Cable, Receiver Mounting Tray, and Power Unit Mounting Tray. Microphone-headset and two antennas are supplied as auxiliary equipment, completing the equipment required for an aircraft installation.

4. Beacon Specifications.-4.1 Electrical -4.1.1 Beacon Transmission.-

4.1.1.1 Pulse Width. - 7 microseconds (nominal).

4.1.1.2 Pulse Spacing.- Coding available from 100 microseconds to 300 microseconds.

4.1.1.3 Group Repetition Frequency - 200 c.p.s.(nominal).

4.1.1.4 Center Frequency - 235mc \pm 0.1mc.

4.1.2 Speech Transmission.-

4.1.2.1 Pulse Width.- 3 microseconds (nominal).

4.1.2.2 Modulation.- Pulse frequency modulation, average p.r.f. 7kc., peak deviation \pm 2 kc. (nominal).

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4.1.2.3 Center Frequency.- Nominal frequency same as beacon operation.

4.1.3 Speech Reception.-

4.1.3.1 Mode of Operation.- Super-regenerative detection, self quenching.

4.1.3.2 Quench Frequency.- Approximately 60 kc.

4.1.4 Input Requirements.- 6V., 1.5A.max.

4.2 Mechanical.-

4.2.1 Size and Shape.-

4.2.1.1 Zone Marker Beacon.- Approximately 9"x3"x1-1/2"

4.2.1.2 Speech Unit.- Approximately 4"x2-1/2"x1-1/4"

4.2.1.3 Antenna.- Telescoping tubing extended length approximately 36 inches, collapsed length approximately 12 inches. 1 1/2"

5. Receiver Specifications.-

5.1 Electrical.-

5.1.1 Input.- A.C.-380 to 420 c.p.s., single phase 75 to 120V., 250 VA maximum. D.C.-24 to 28V., 1/2 A. maximum

5.1.2 Sensitivity.- 10 microvolts maximum for 2 to 1 signal plus noise to noise ratio.

5.1.3 Display.- Oscillographic similar to J scope. Amplitude of pips give directional information and location identity of beacon.

5.1.4 Antenna Switching.- Incorporated in receiver and synchronized to display.

5.1.5 Speech Facility.- A pulse frequency modulation detector and audio amplifier are incorporated for reception of speech transmission from beacon. A tunable A.M. transmitter is incorporated for voice transmission to beacon. A quarter-wave vertical antenna (not supplied) is required for transmitter.

5.1.6 Antennas.- Streamlined antennas consisting of vertical driven dipole and director are supplied. One shall be installed on each side of aircraft such that each antenna "looks" ahead and thirty to forty-five degrees to its respective side, and patterns overlap at approximately half-power points in line with aircraft heading.

5.2 Mechanical.-

5.2.1 Size and Shape.-

5.2.1.1 Receiver.- Approximately 12" x 8" x 10".

5.2.1.2 Power Unit.- Approximately 12" x 7" x 7-1/2".

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5.2.2 Weight.-- Total installed weight, less antennas and aircraft cabling, 40 pounds maximum.

5.2.3 Mounting.-- Supplied with mounting trays designed for aircraft installation.

5.2.4 Environmental.-- Receiving equipment not of final military design. It will operate satisfactorily under all conditions likely to be met during evaluation flight tests. Equipment will not meet MIL-E-5400 requirements.

6. System Performance.--

6.1 Beacon.--

6.1.1 Range.-- Ranges as high as 90 miles over sea at 10,000 feet have been obtained in Europe. Following performance may be expected.

6.1.1.1 Over Sea.-- 60 miles at 10,000 feet
40 miles at 5,000 feet
20 miles at 1,000 feet

6.1.1.2 Over Average Soil.-- 45 miles at 10,000 feet
30 miles at 5,000 feet
15 miles at 1,000 feet

6.1.2 Heading Accuracy.-- Depends upon antenna installation. ± 3 degree accuracy realizable.

6.1.3 Accuracy of Final Fix.-- 150 feet at 500 feet altitude.

6.2 Speech.--

6.2.1 Range.-- Range of 10 miles at 10,000 feet over sea has been obtained in Europe. Following performance may be expected.

6.2.1.1 Over Sea.-- 5 miles at 10,000 feet
3 miles at 5,000 feet
1 mile at 1,000 feet

6.2.1.2 Over Average Soil.-- 3 miles at 10,000 feet
2 miles at 5,000 feet
1 mile at 1,000 feet

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